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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/480,223	01/10/2000	SEAMUS PAUL WHISTON	G0631/7010	4079

7590 10/22/2002

STEVEN J HENRY
C/O WOLF GREENFIELD & SACKS
FEDERAL RESERVE PLAZA
600 ATLANTIC AVENUE
BOSTON, MA 022102215

EXAMINER

HUYNH, YENNHU B

ART UNIT	PAPER NUMBER
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2813

DATE MAILED: 10/22/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/480,223

Applicant(s)

WHISTON ET AL.

Examiner

Yennhu B. Huynh

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 July 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 8.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Election/Restrictions

Claims 16-27 have been cancelled in Amendment filed on 8/27/01.

Claim Rejections - 35 USC § 112

Claims amended overcome rejections. Rejections withdrawn.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Han et al. (U.S. 5,409,848) in view of Hshieh (U.S. 4,931,408).

Hshieh at figs. 1-11 in related art col. 1-6 disclose a method of forming a DMOS transistor, which includes forming a conductive gate over gate oxide; forming a body region, after formed the gates, by an ion implantation, extending beneath the gate, and align with the gate where the gate act as a mask; dopant boron or phosphorous implanted in the drain region is diffused into the body region (col.3 & 4).

However, Hshieh does not teach the implanting in a portion of the drain region or through the drain region, for forming the body region; and the dosage, energy and angle of implants as claimed.

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Han et al. at fig. 1 in related art col. 1-10 disclose a method of non uniformly doping a MOS using angles. Han teach the implanting in a portion of the drain region or through the drain region, for forming the body region 15 and extended body region 16 underneath of the oxide gate, and the use of oblique rotating ion implantation toward the drain to form pocket implant region 16 (col. 7,8, lines 46-25), as well as the precise of dosage, energy level, and range of angle of the implants is optimized (col. 8, lines 8-10). Han also teaches dopant boron is implanted to adjust the threshold voltage for CMOS circuits (col. 8, lines 8-15) and the use of dopant boron/ phosphorous in the implantation at a position beneath the gates by ion implanting (col.7, lines 47-50 & 65-68).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to include the technique of an oblique rotating ion implantation toward the drain to form pocket implants/extended body region, as well as the optimized range of dosage, energy level, and angle of the implants, by Han's process, into Hshieh 's process to have a desired drain/source threshold voltage or breakdown threshold voltage.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 14 & 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hshieh in view of Han and further in view of Contiero et.al. (Cited in Background of The Invention).

Hshieh and Han teach all substantially of the claimed invention except where the forming the body region in the drain region of the DMOS device is a LDMOS and relates to CMOS.

Contiero cited in Background of The Invention as set forth at pages 1-3 of the specification disclose a method for integrating a self aligned DMOS device, which includes the implantation into the drain region to form a body region and relates LDMOS to a CMOS and DMOS process.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to include the technique of different ion implantation angle toward the drain to form pocket implants/extended body region, as well as the optimized range of dosage, energy level, and angle of the implants, by Han's process, into Contiero 's process of forming of an LDMOS device related to a CMOS process, to control the threshold breakdown voltage as desired.

Response to Arguments

Applicant's arguments filed 1/31/02 have been fully considered but they are not persuasive. Contrary to the Applicant's arguments in Remarks of 1/31/02 is about:

-1). Hshieh disclose forming a body region in a DMOS device by an implantating, but does not disclose a second implanting to form the extended body region and the implantatings is processed at different angles (p.4).

-2). Han does not disclose:

-forming a body region in a DMOS device and in a drain region (p.5)

-two implantation steps at different angles for forming the body region and extended body region (p.6)

-3). Contiero diclose forming a body region in LDMOS but not at different angles (p.7).

Applicant's attention is respectfully directed to:

Han ('848) relates to forming the body region of a DMOS transistor by an ion implantation (col.5, lines 32-36). Han also disclose an implanting into substrate where the entire area of source and drain are implanted to form a body region 15, at an angle greater 0 degrees and less than 90 degrees (col. 6, lines 55-66 and col. 7, lines 47-64); a second implanting into drain region and adjacent the gate, to form the extended body region 16 directly beneath the gate, for desired threshold voltage, and at may be angle of 45 degrees or between 5-75 degrees (col.7 & 8, lines 65-25).

The discloses from Han 's process is combined to Hshiel and Contiero 's process is completely disclose substantially all of claimed invention. Han does not teach or suggest any mehtof

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yennhu B. Huynh whose telephone number is 703-308-6110. The examiner can normally be reached on M-F 8.30AM-7.00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead, can be reached 703-308-4940. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

YNBH,

10/17/02


CARL WHITEHEAD, JR.
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800